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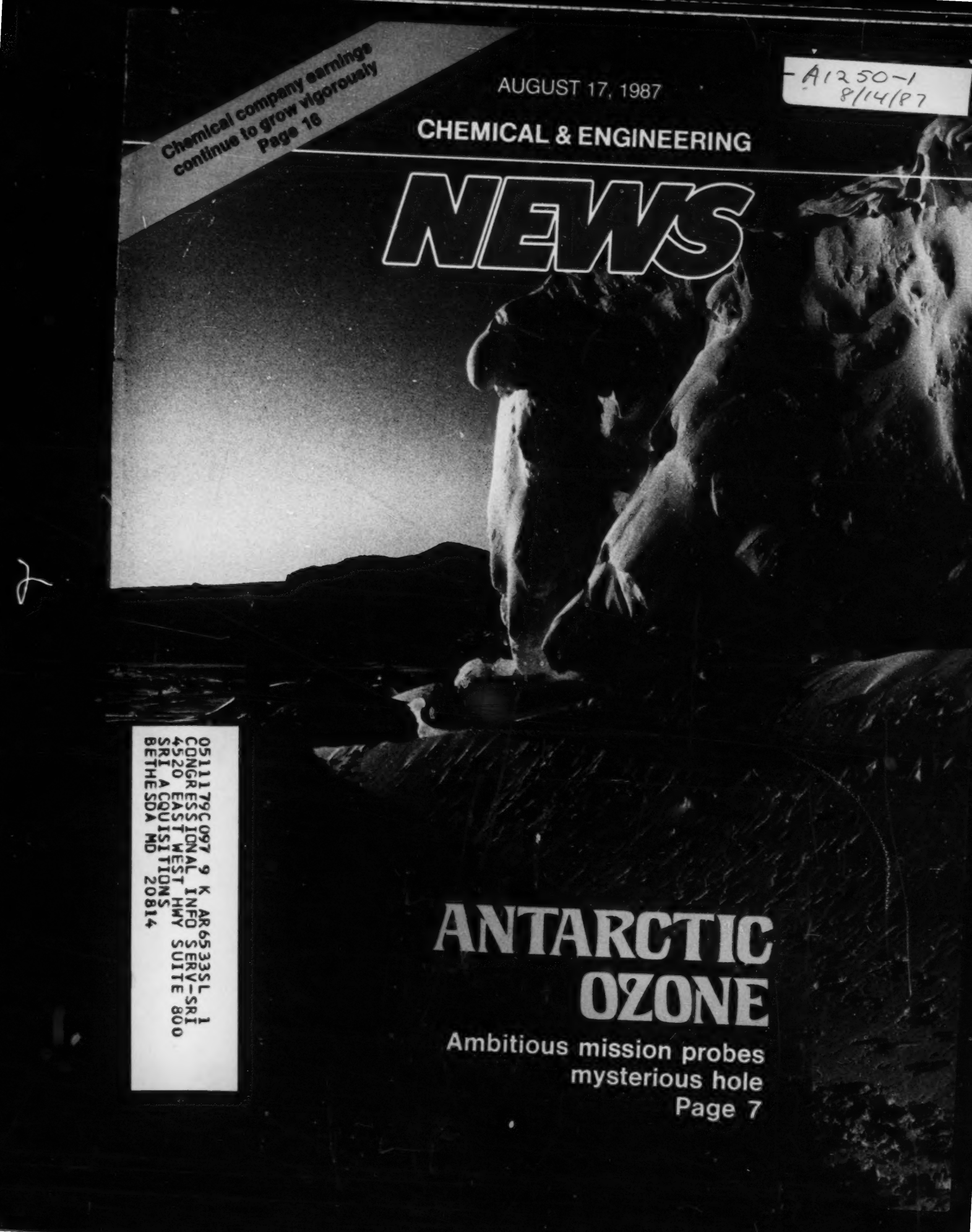
AUGUST 17, 1987

CHEMICAL & ENGINEERING

NEWS

Chemical company earnings continue to grow vigorously
Page 16



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ANTARCTIC OZONE

Ambitious mission probes mysterious hole
Page 7

CHEMICAL & ENGINEERING
NEWS

Volume 65, Number 33
CENEAR 65 (33) 1–40
ISSN 0009-2347

AUGUST 17, 1987

News of the Week

■ **Clinical trials of experimental drug tetrahydroaminoacridine to treat memory loss in Alzheimer's victims are planned by government-industry cooperative project.** **Page 4**

■ **EPA and Velsicol Chemical reach an agreement that will halt U.S. sales of chlordane, a controversial termiticide suspected of causing cancer.** **Page 5**

■ **Studies by Defense Science Board and Lawrence Livermore National Laboratory warn against premature development of Strategic Defense Initiative.** **Page 5**

■ **Chemical stocks keep pace with Dow Jones during its recent record-breaking surge.** **Page 6**

Business

Major U.S. chemical firms reported continuing strong growth in second-quarter 1987, however economic slump in agriculture, construction, and auto industry is dampening chemical sales to these markets. **Page 16**

Government

EPA is building a database on extent of indoor radon hazard using surveys of gas concentrations in homes in 17 states, data collected by the states themselves, and epidemiological studies. **Page 22**

Science

Two antibacterial peptides—called magainins by their discoverer, NIH scientist Michael Zasloff—have been isolated from frogs, may have therapeutic applications in humans. **Page 27**

ACS News

Overall, employers pay dues for 34% of all ACS members; ACS and the National Materials Property Data Network will offer databases on properties of materials. **Page 28**

Cover: Erebus glacier, Antarctica. Photo by Robert L. de Zafra, SUNY Stony Brook

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News Focus

Airborne Antarctic mission, which is scheduled to begin this week, will probe the origins of the ozone hole over Antarctica. **Page 7**

Chemical & Engineering News

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LETTERS

Lift veil of anonymity

SIR: I enjoyed Joel Tellinghuisen's letter (C&EN, June 1, page 2) suggesting that referees for publications be acknowledged in print, and suggest that the notion be taken a step further—that referee comment forms for grant proposals be returned to the submitter with signatures and addresses. Too often it is painfully obvious that proposals that are the result of weeks of hard work are not read in their entirety, are not read by referees with the proper expertise, or have been read by people so lacking in sound judgment that it is unclear how they were selected for the task.

The tales of woe are not only my own. A friend at another small college that had sought an instructional nuclear magnetic resonance spectrometer told me their proposal was rejected because the investigator's expertise to run the equipment was questioned. A few years ago one of my projects was rated low because of an opinion that television just did not belong in a chemistry classroom, and there was evidence then that not all the reviewers had read the proposal carefully.

This year a modest proposal requesting several pieces of equipment that would receive heavy use by the entire science division was rejected because it was not innovative enough. A comment on the request for a UV-vis spectrophotometer to replace one quite worn out was, "What new experiments could be performed on this new instrument that can't be done on the old?" The answer is that no experiments can be performed if we have no UV-vis. Likewise, a reviewer commenting on the request for electronic balances to replace some triple-beam balances (never having had top-loading mechanical balances) for general and organic labs was, "Electronic balances should not be used in organic chemistry and actually I do not see their purpose in general chemistry either." I question whether the reviewer has student prep workers preparing solutions using triple-beam balances, as I do. This was stated in the proposal.

Perhaps referees are more careful and less biased when evaluating proposals for basic research. From my experience there is a need for more thorough evaluation by more qualified people. If the veil of anonymity were lifted referees might try a bit harder.

Robert F. Drake
Associate Professor of Chemistry
New College of University of South Florida, Sarasota

Labeling of periodic table

SIR: Like others, I have been following with great interest the correspondence in this column relating to the labeling of the periodic table. Essentially any labels used in the table should perform two basic functions. They should allow us to unambiguously specify the location of an element in the table—a function that is essentially spatial—and they should impart useful information about the chemistry and/or electronic structures of the elements. An ideal system of labels would combine both of these functions simultaneously. However, the large number of systems that have been proposed and the lack of consensus shown in the correspondence suggest that this goal might be overambitious and that we might consider separating these two logically distinct functions.

Therefore, I propose that all tables use both a separate set of spatial labels and a separate set of chemical/electronic labels. The choice of the spatial labels would be fixed and correspond to a simple numbering of the columns, just as we currently number the rows. Thus we would speak of an element as being in column three (reserving the word group for various chemical/electronic labels) or of the column 17 elements, or, for complete specification, of the element in column two, row six (i.e., Ba), etc. These labels would be used for indexing and abstracting in all papers and books where the authors do not have a special point to make relative to periodic trends.

The choice of a set of chemical/electronic labels, on the other hand, would be left to personal preference. Any book or paper where the authors feel that their particular choice of labels is essential to the points being made would, in all probability, also be a paper or book in which it would be appropriate to reproduce a periodic table explicitly showing the chemical/electronic labeling system

Correction

• July 27, page 61: Wayne State University's total spending for chemical R&D in 1985 was $2.903 million, not $2.093 million. As a result, the % federal funds was 72% and the change from 1984 was −5%.

Chemical stocks surge upward with Dow Jones

The Dow Jones Industrial Average was not the only stock market measure to break through barriers and set new ground last week. C&EN's own index of chemical stocks also leaped into new territory.

Last Monday much of the news focused on the Dow Jones Industrial Average as the index surged past the 2600 level to finish the day at 2635, a 44-point, or 1.7%, gain for the day. At the same time, C&EN's index of chemical stocks broke through the 600 level, to finish the day at 603 (1957 = 100), up 1.3% from Friday's close of 595.

C&EN's chemical stock index is based on the weighted market value of seven companies—American Cyanamid, Dow Chemical, W. R. Grace, Hercules, Monsanto, Rohm & Haas, and Union Carbide.

The good news did not end with Monday, however. On Tuesday, the Dow Jones soared another 45 points to end the trading period at 2680, another 1.7% increase over the previous day's close. And again, C&EN's chemical stocks index followed suit, climbing to 610, again a 1.3% gain from the day before.

By Wednesday, however, the market took a breather as profit takers and programed trading took over and the Dow Jones settled back 11 points, or 0.4%, to 2669.32. Chemical stocks settled down, too, but did not retreat as did the Dow Jones. Instead, C&EN's index climbed an additional point to 611.

"This looks like another barnburner year for most chemical firms," says Theodore S. Semegran, chemicals analyst for Shearson Lehman Brothers. He points to very low inventories of commodity chemicals, fibers, and plastics, coupled with high capacity utilization rates in much of the industry as giving chemical companies a further boost in business for the rest of the year. Other positive aspects noted by Semegran include increasing exports and decreasing imports of chemicals and pricing improvements in many chemicals. Further, Semegran says, the business in July was practically as good as it was in June, indicating that there was not the summer slowdown normally seen in the chemical industry.

Other analysts also are pointing to tight supplies, particularly in plastics such as polyethylene and polypropylene, as harbingers of continued earnings improvement through the remainder of 1987, and thus as the reason for the good showing in chemical stock prices.

That chemical stocks did so well in the recent stock market rally is not surprising, considering that in the six months ending Aug. 10, they slightly outperformed the Dow Jones and did better than all of the other major market indexes. During that period, C&EN's index rose 21.6%. The Standard & Poor's 400 Industrials was closest to this with a 21.4% gain, followed by the Dow Jones with a 20.5% gain and the New York Stock Exchange Industrials with a 20.1% increase. However, gains by the other indexes were lower—the Standard & Poor's 500 at 17.1%, the New York Stock Exchange Composite at 14.7%, the American Stock Exchange Index at 14.5%, the Over-the-Counter Industrials at 13.5%, and the Over-the-Counter Composite at only 9.7%.

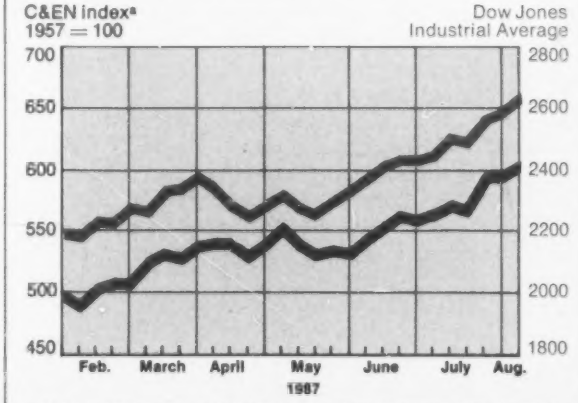
Of the companies comprising C&EN's index, the best performance during the six months before the measure's breaking the 600 level was by W. R. Grace, whose stock price rose 33%. This was followed by Dow Chemical, up 28%; Rohm & Haas, up 23%; American Cyanamid, up 20%; Monsanto, up 16%; Hercules, up 13%; and Union Carbide, up 9%.

The stock market is generally regarded as a leading indicator for company fortunes, and chemical stocks are performing well primarily because of the outlook for earnings in the industry. Through the first six months of this year, earnings for C&EN's sample of 30 chemical companies have risen an average of more than 30% (see page 16) and profit margins for the firms have risen to 6.7%, their highest level in years. And industry analysts say that the earnings outlook for the rest of the year is just as good. □

Chemical stock index slightly outperformed others in past six months

	Aug. 10, 1987	Feb. 6, 1987	% change
Dow Jones Industrial Average	2635.84	2186.87	20.5%
New York Stock Exchange Composite	183.45	159.93	14.7
New York Stock Exchange Industrials	225.96	188.17	20.1
American Stock Exchange Index	362.74	316.73	14.5
Over-the-Counter Composite	446.27	406.91	9.7
Over-the-Counter Industrials	478.42	421.66	13.5
Standard & Poor's 500	328.00	280.04	17.1
Standard & Poor's 400 Industrials	383.89	316.29	21.4
C&EN chemical stock index	603	496	21.6

Chemical stock growth parallels Dow Jones industrials gains



a C&EN weighted stock price index for American Cyanamid, Dow Chemical, W. R. Grace, Hercules, Monsanto, Rohm & Haas, and Union Carbide.

Chemical Earnings' Strong Growth Continues in Second Quarter

William J. Storck, C&EN New York

Earnings of major U.S. chemical companies grew strongly in this year's second quarter, averaging 30% and continuing a string of year-to-year gains. Strong earnings growth also was reported by major diversified companies that produce chemicals, although total earnings for U.S. oil firms fell.

In addition, average profit margin for chemical firms hit 7.0%, the highest level in years, as earnings continued to increase at a much greater rate than sales—in the second quarter about three times as fast. However, this is a much smaller multiple than in many recent quarters and may indicate that cost-cutting and productivity improvement measures implemented by chemical companies over the past few years have contributed about all they can. Nevertheless, the cost efficiency steps plus improved capacity utilization in many areas, notably plastics, are still providing plenty of earnings leverage.

In addition to a possible slowdown of the effects of efficiency moves, there are some further unsettling aspects in many of the major markets for chemicals, notably in agriculture, construction, and automobiles. Agriculture is still in the doldrums after more than five years of farm recession in the U.S. There are signs, however, of relief ahead. The Department of Agriculture recently said that land values in the farm belt may have ended their slide and in some cases have already started to improve. This bit of optimism in the agricultural economy

Chemical industry leaders for the second quarter . . .

Sales

Rank 1987		$ Millions	Rank 1986
1	Dow Chemical	$3408.0	1
2	Monsanto	2025.0	2
3	Union Carbide	1658.0	3
4	W. R. Grace	1147.4	5
5	American Cyanamid	1087.3	4
6	Hercules	688.1	7
7	Rohm & Haas	597.3	8
8	B. F. Goodrich	551.1	6
9	National Distillers	550.6	13
10	Air Products	527.8	9

Earnings[a]

	$ Millions	Rank 1986
Dow Chemical	$315.0	1
Monsanto	154.0	2
American Cyanamid	75.6	4
Union Carbide	69.0	8
Rohm & Haas	62.1	5
Hercules	60.6	3
Ethyl	47.8	6
Air Products	41.0	7
B. F. Goodrich	38.3	11
W. R. Grace	36.0	22

Profitability

	Earnings as % of sales	Rank 1986
International Flavors	15.5%	2
Ethyl	11.4	3
First Mississippi	10.8	24
Rohm & Haas	10.4	6
Betz Laboratories	10.4	5
Loctite	9.9	4
Nalco Chemical	9.8	8
Dow Chemical	9.2	9
Hercules	8.8	7
Freeport-McMoRan	8.5	1

. . . and for the first six months of 1987

Sales

Rank 1987		$ Millions	Rank 1986
1	Dow Chemical	$6423.0	1
2	Monsanto	3891.0	2
3	Union Carbide	3339.0	3
4	W. R. Grace	2110.0	5
5	American Cyanamid	2101.4	4
6	Hercules	1352.4	7
7	National Distillers	1207.3	12
8	Rohm & Haas	1130.4	8
9	Air Products	1054.9	9
10	B. F. Goodrich	1036.7	6

Earnings[a]

	$ Millions	Rank 1986
Dow Chemical	$561.0	1
Monsanto	292.0	2
American Cyanamid	137.1	3
Union Carbide	135.0	5
Rohm & Haas	119.5	6
Hercules	109.3	4
Ethyl	94.1	7
Air Products	82.2	8
International Flavors	58.6	9
National Distillers	50.9	17

Profitability

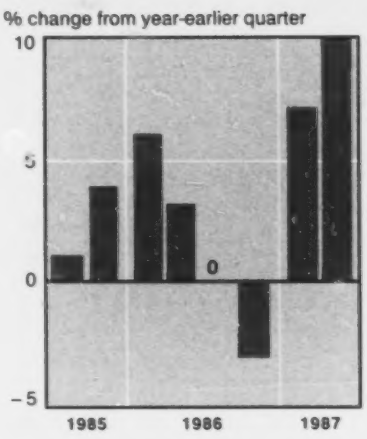
	Earnings as % of sales	Rank 1986
International Flavors	15.5%	1
Ethyl	11.6	4
Betz Laboratories	10.7	3
Rohm & Haas	10.6	7
Loctite	9.8	5
Nalco Chemical	9.6	6
Dow Chemical	8.7	11
Hercules	8.1	8
Lubrizol	7.9	13
Air Products	7.8	12

Note: For 30 chemical companies listed on page 18. a After taxes.

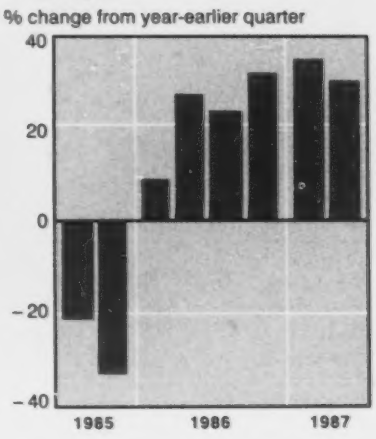
Chemical industry second-quarter 1987 results

- Sales increase 10%
- Earnings soar 30%
- Profit margins hit 7%
- Production rises 4.3%
- Prices climb 3.6%

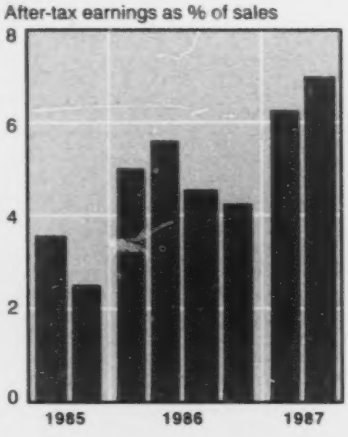
Sales



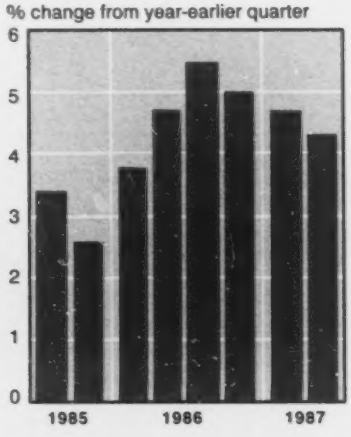
Earnings



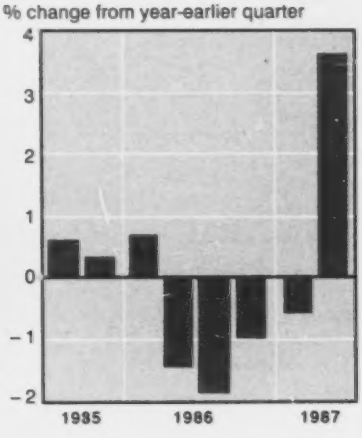
Profit margins



Production

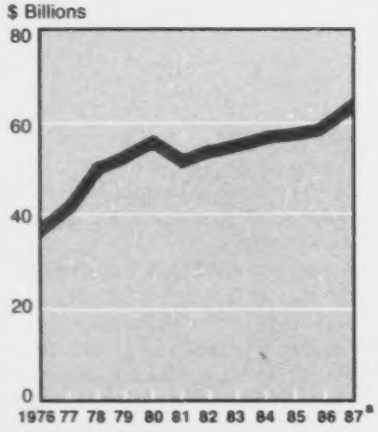


Prices

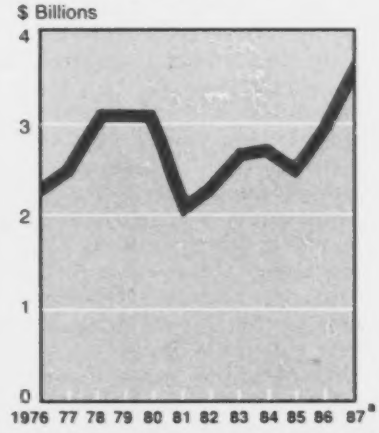


Sales this year will increase about 10%, but earnings will jump 25%, boosting profit margins to 5.7%

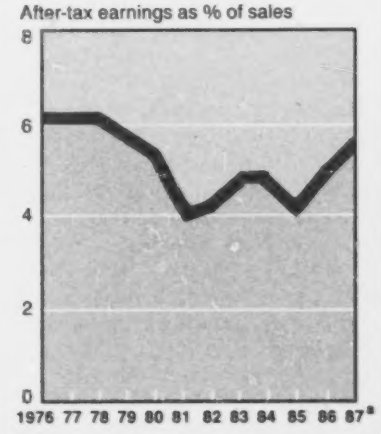
Annual sales



Annual earnings



Annual profit margins



Note: All sales, earnings, and profit-margin data are based on combined results of 30 companies listed on page 18. a C&EN estimates.

Earnings and profit margins rise sharply for major chemical companies in second quarter

	SECOND-QUARTER 1987						FIRST-HALF 1987			
	Sales	Earnings[a]	Change from 1986		Profit margin[b]		Sales	Earnings[a]	Change from 1986	
	($ millions)		Sales	Earnings	1987	1986	($ millions)		Sales	Earnings[a]
Air Products[c]	$ 527.8	$ 41.0	8%	5%	7.8%	8.0%	$ 1,054.9	$ 82.2	6%	21%
American Cyanamid[c]	1,087.3	75.6	6	34	7.0	5.5	2,101.4	137.1	8	30
Aristech	228.5	16.1	19	50	7.0	5.6	437.2	29.6	13	64
Betz Laboratories	97.5	10.1	12	10	10.4	10.6	186.1	19.8	9	6
Cabot[c]	319.4	14.5	3	1	4.5	4.6	650.6	33.9	0	6
Chemed	98.8	5.3	10	42	5.4	4.1	189.9	9.6	11	34
Crompton & Knowles	64.7	3.6	16	36	5.6	4.8	120.5	6.0	10	25
Dow Chemical[c,d]	3,408.0	315.0	20	39	9.2	8.0	6,423.0	561.0	15	40
Ethyl[c]	420.3	47.8	4	−1	11.4	11.9	809.3	94.1	3	13
First Mississippi	90.1	9.7	40	379	10.8	3.1	161.4	12.0	24	191
Freeport-McMoRan	311.9	26.5	88	−10	8.5	17.8	530.7	34.2	63	−12
H. B. Fuller	151.3	6.9	14	32	4.6	4.0	288.7	10.6	15	31
B. F. Goodrich[c]	551.1	38.3	−27	61	6.9	3.1	1,036.7	42.1	−30	1258
W. R. Grace[c]	1,147.4	36.0	25	448	3.1	0.7	2,110.0	47.7	20	260
Hercules[c]	688.1	60.6	0	1	8.8	8.7	1,352.4	109.3	1	4
International Flavors	199.9	31.0	23	29	15.5	14.9	378.8	58.6	22	27
International Minerals[c]	460.5	2.6	4	def	0.6	def	916.5	21.2	7	def
Loctite	96.5	9.5	30	18	9.9	10.9	186.2	18.3	32	45
Lubrizol	267.1	20.6	2	9	7.7	7.3	541.6	42.7	1	17
Monsanto[c]	2,025.0	154.0	8	4	7.6	7.9	3,891.0	292.0	8	10
Nalco Chemical	202.6	19.8	10	28	9.8	8.4	394.2	37.9	9	23
National Distillers[c]	550.6	22.0	53	315	4.0	1.5	1,207.3	50.9	45	122
Olin[c]	485.9	22.3	10	56	4.6	3.2	958.6	46.7	6	21
Pennwalt	311.9	13.7	8	20	4.4	3.9	588.4	26.1	6	3
Petrolite	68.6	4.1	−8	−29	6.0	7.8	132.5	8.1	−12	−30
Reichhold Chemicals	na	na	na	na	na	1.4	na	na	na	na
Rohm & Haas[c]	597.3	62.1	5	11	10.4	9.8	1,130.4	119.5	2	27
Union Carbide[c]	1,658.0	69.0	3	92	4.2	2.2	3,339.0	135.0	4	42
Vista Chemical	160.3	10.7	14	2	6.7	7.5	312.1	22.0	8	13
Witco[c]	356.5	17.6	3	1	4.9	5.0	690.4	32.5	0	3
Total 15 larger companies[d]	**$14,283.1**	**$ 978.4**	**9%**	**32%**	**6.9%**	**5.7%**	**$27,671.5**	**$1805.2**	**7%**	**34%**
Total 14 smaller companies[d]	**$ 2,349.6**	**$ 187.7**	**19%**	**19%**	**8.0%**	**8.0%**	**$ 4,448.5**	**$ 335.3**	**14%**	**19%**
GRAND TOTAL[d]	**$16,632.7**	**$1166.1**	**10%**	**30%**	**7.0%**	**6.0%**	**$32,119.9**	**$2140.5**	**8%**	**31%**

a Earnings from continuing operations, excluding major nonrecurring and extraordinary items. b Earnings as a percentage of sales. c One of the 15 largest companies. d Averages for 12-month running data do not include Dow, where figures include a major nonrecurring item, and Aristech, Vista, and Reichhold, for which not all figures are available. def = deficit. na = not available.

could foreshadow an increase in economic activity. If that comes about, it could benefit pesticide producers quickly, but it could be a long time before fertilizer makers see much help as they struggle to raise capacity use to more respectable levels.

Construction activity has slowed recently, especially in the residential area. New housing starts (seasonally adjusted) have fallen in each of the past five months, according to the Department of Commerce.

Perhaps more chilling is the automobile industry. Domestic auto makers are entering the new model year with large inventories of unsold 1987 model-year cars. These inventories exceed more than two months' supply in some cases and may put a damper on chemical sales to the auto industry through the rest of this year. Further, the big inventories of unsold autos indicate that U.S. makers were unable to take much advantage of the declining value of the dollar against the Japanese yen in their battle against imports. Further, Korean auto makers were able to maintain their prices in relation to American autos as the Korean currency fell along with the dollar.

In spite of the drag of these markets on overall chemical activities, U.S. chemical shipments in the second quarter increased almost 8% on a seasonally adjusted basis from the same period a year ago. However, production of chemicals and allied products, as reported by the Federal Reserve Board, increased just 4.3% as chemical producers cut inventories going into the normally lackluster third quarter. The 4.3% increase is the lowest since first-quarter 1986, when chemical output rose just 3.8%.

Some of the best news of the quarter was in chemical pricing, which also did a lot to improve earnings leverage in the three-month period. According to Labor Department figures, prices of chemicals and allied products rose 3.6% from last year's second quarter. This ends a string of falling year-to-year price

FIRST-HALF 1987		12-MONTH RUNNING DATA			
Profit margin[b]		Change from 1986		Profit margin[b]	
1987	1986	Sales	Earnings	1987	1986
7.8%	6.8%	7%	7%	7.4%	7.4%
6.5	5.4	8	37	6.0	4.7
6.8	4.7	na	na	na	na
10.7	10.9	5	−1	10.1	10.8
5.2	4.9	−7	1	5.2	4.8
5.0	4.2	1	−1	4.7	4.8
5.0	4.4	−3	17	4.3	3.6
8.7	7.2	5	362	7.5	1.7
11.6	10.7	4	24	11.6	9.7
7.4	3.2	4	72	4.3	2.6
6.4	11.9	29	−15	7.2	11.0
3.7	3.2	16	33	3.8	3.3
4.1	0.2	−32	def	3.3	def
2.3	0.8	11	−56	0.7	1.7
8.1	7.9	2	23	7.9	6.6
15.5	14.9	23	24	14.2	14.1
2.3	def	16	def	0.3	def
9.8	9.0	27	32	9.1	8.7
7.9	6.8	4	23	7.5	6.4
7.5	7.4	1	38	4.6	3.3
9.6	8.5	7	2	8.6	9.1
4.2	2.8	−3	36	4.0	2.8
4.9	4.3	3	9	3.3	3.2
4.4	4.6	7	230	4.6	1.5
6.1	7.7	−14	−31	5.3	6.7
na	1.0	na	na	na	def
10.6	8.5	2	25	9.2	7.5
4.0	3.0	2	47	2.9	2.0
7.0	6.7	na	na	na	na
4.7	4.6	−4	3	4.8	4.5
6.5%	**5.2%**	**0%**	**31%**	**4.6%**	**3.6%**
7.5%	**7.2%**	**10%**	**17%**	**7.2%**	**6.8%**
6.7%	**5.5%**	**2%**	**28%**	**5.0%**	**4.0%**

comparisons that lasted for the four previous quarters.

All these factors translated into higher earnings and sales for the chemical industry. For 29 of the 30 major chemical companies surveyed by C&EN (Reichhold Chemicals had not reported by press time), combined earnings increased 30% from last year's second quarter to a total of $1.17 billion. Composite sales increased 10% to $16.6 billion. As a result, the average profit margin (earnings as a percentage of sales) for the 29 firms increased to 7.0% from 6.0% in second-quarter 1986 and 6.2% in this year's first quarter.

The larger companies improved their earnings much more than did the smaller firms. For the 15 larger chemical companies surveyed, earnings rose an average of 32% (compared with the same 15 firms' earnings in last year's second quarter) to a combined total of $978 million. Sales for these firms increased 9% to $14.3 billion. Their combined profit margin increased to 6.9% from 5.7% in last year's second quarter.

For the 14 smaller firms, earnings increased an average of 19% to a combined total of $188 million, and sales rose an equal amount to $2.35 billion. Since earnings and sales both rose 19%, average profit margin remained at 8.0%. The higher figure indicates higher profitability of the smaller firms over the larger ones.

In comparing figures for this year's first half, the pattern was much the same as in the second quarter. Combined first-half earnings for the 29 chemical companies increased 31% from first-half 1986 to a total of $2.14 billion. Combined sales rose 8% to a total of $32.1 billion. Average profit margin for the group increased to 6.7% from 5.5% during the first half of 1986.

For the 15 larger firms of the group, combined earnings advanced 34% to a total of $1.81 billion on a 7% sales increase to $27.7 billion. Profit margins for the group increased to an average of 6.5% from 5.2% in first-half 1986.

For the 14 smaller companies, which are oriented more toward value-added products, earnings grew an average of 19% to a combined $335 million, and sales increased 14% to a total of $4.45 billion. Profit margins for the group averaged 7.5%, up from 7.2% in first-half 1986.

Plastics were important contributors to higher earnings at many of the companies. For instance, Dow Chemical executive vice president Robert M. Keil says: "Strong demand for basic chemicals and plastics continued in the second quarter as world economies maintained a moderate but sustained rate of growth. Polyethylene and Styron polystyrene resins were major contributors among basic plastics."

The importance of plastics growth is reflected in B. F. Goodrich's results. Sales of polyvinyl chloride and intermediates for the second quarter increased 19% over the year-earlier period to $267 million. However, operating income from this division was up 69% in the same period to $35.4 million.

Agriculture, still generally depressed in the U.S. economy, provided some mixed results among the companies. For instance, American Cyanamid's earnings report states that the "agricultural group registered significantly higher operating earnings as a result of dramatically higher worldwide sales of crop protection, vegetative, and pest control chemicals."

However, for Monsanto, in spite

Ground rules for C&EN earnings analysis

C&EN's quarterly report on financial performance of the U.S. chemical industry contains data from the 30 largest U.S. basic chemical companies and from 29 oil and diversified companies, each with more than $200 million in annual chemical sales.

To be included in the table of basic chemical producers, a company must have at least 50% of its sales in chemicals. That is why Du Pont, for example, is included in the table of diversified manufacturers.

In referring to chemical sales, C&EN means those chemicals whose molecular composition has been changed in the course of manufacture. Hence, chemical sales include those of traditional categories of basic petrochemicals and inorganics, organic intermediates and inorganic compounds, polymers such as plastics and fibers, agricultural chemicals, and specialty derivatives.

In listing earnings, the survey gives after-tax income for continuing operations before nonrecurring items and extraordinary charges. Foreign currency translations are included.

Earnings were down at many oil firms, but up at diversified companies

	Chemical sales as % of total	SECOND-QUARTER 1987 Sales ($ millions)	Earnings[a]	Change from 1986 Sales	Earnings	Profit margin[b] 1987	1986	FIRST-HALF 1987 Sales ($ millions)	Earnings[a]	Change from 1986 Sales	Earnings	Profit margin[b] 1987	1986
OIL AND GAS COMPANIES													
American Petrofina	23%	$ 610.4	$ 28.7	30%	547%	4.7%	0.9%	$ 1,149.9	$ 48.5	18%	def	4.2%	def
Amoco	15	5,629.0	311.0	13	31	5.5	4.8	10,824.0	571.0	−1	0%	5.3	5.2%
Ashland	20	1,900.0	40.0	6	−51	2.1	4.6	3,500.0	32.0	−3	−74	0.9	3.4
Atlantic Richfield	33	4,103.0	330.0	16	120	8.0	4.2	7,847.0	569.0	0	27	7.3	5.7
Chevron	9	7,300.0	194.0	9	−32	2.7	4.3	14,100.0	344.0	−8	−45	2.4	4.1
Exxon	8	20,162.0	1150.0	12	3	5.7	6.2	39,597.0	2227.0	−2	−46	5.6	10.2
Kerr-McGee	14	726.4	27.3	16	757	3.8	0.5	1,273.2	47.5	−5	88	3.7	1.9
Mobil	4	13,529.0	304.0	11	−48	2.2	4.8	26,282.0	556.0	1	−46	2.1	3.9
Occidental Petroleum	13	4,328.0	59.0	13	51	1.4	1.0	8,485.0	136.0	14	20	1.6	1.5
Phillips Petroleum	17	2,643.0	3.0	13	def	0.1	def	5,182.0	−29.0	−5	def	def	1.9
Shell Oil	20	5,487.0	266.0	24	21	4.8	4.9	10,269.0	374.0	9	−24	3.6	5.3
Sun Co.	3	2,380.0	90.0	−4	−10	3.8	4.0	4,610.0	128.0	−21	−48	2.8	4.2
Texaco	4	8,500.0	240.0	8	0	2.8	3.0	17,000.0	358.0	−3	−30	2.1	2.9
DIVERSIFIED COMPANIES													
Allied-Signal	24	2,846.0	69.0	15	−46	2.4	5.2	5,483.0	213.0	11	−29	3.9	6.1
Borden	33	1,601.7	62.7	29	21	3.9	4.2	3,030.2	106.7	28	20	3.5	3.7
Du Pont	44	7,841.0	486.0	13	7	6.2	6.6	14,942.0	877.0	6	2	5.9	6.1
Eastman Kodak	21	3,210.0	313.9	19	90	9.8	6.2	5,860.0	539.9	16	118	9.2	4.9
Eli Lilly	19	1,017.6	150.3	16	20	14.8	14.3	2,076.6	355.5	11	19	17.1	16.0
Engelhard	29	600.9	18.0	22	17	3.0	3.1	1,140.0	31.6	12	18	2.8	2.6
FMC	47	828.5	133.6	3	172	16.1	6.1	1,552.8	158.9	0	112	10.2	4.8
GAF	51	214.2	29.7	8	34	13.9	11.2	405.3	50.2	8	35	12.4	9.9
KaiserTech[c]	12	584.2	−359.1	5	def	def	def	1,121.5	−390.2	3	def	def	def
Koppers	42	389.1	24.0	5	35	6.2	4.8	660.8	21.0	5	22	3.2	2.7
3M	15	2,381.0	240.0	9	21	10.1	9.1	4,588.0	453.0	8	20	9.9	8.9
Merck	9	1,249.3	235.1	24	36	18.8	17.2	2,360.4	436.3	23	32	18.5	17.2
Morton-Thiokol	33	557.9	36.4	14	21	6.5	6.1	1,077.7	72.6	7	10	6.7	6.6
PPG Industries	18	1,330.0	102.4	10	12	7.7	7.6	2,590.0	189.3	10	18	7.3	6.9
Tyler	40	277.6	5.2	12	21	1.9	1.7	533.7	6.2	12	20	1.2	1.1
Vulcan Materials	27	284.9	38.7	11	18	13.6	12.8	497.7	50.1	9	23	10.1	8.9

a From continuing operations excluding major nonrecurring and extraordinary items. b Earnings as a percentage of sales. c Includes nonrecurring item. def = deficit.

of a 3% increase in sales of crop chemicals to $372 million, operating income from these chemicals fell almost 5% to $147 million.

Overseas business helped some companies. For instance, of Rohm & Haas' 11% earnings gain, chairman Vincent L. Gregory Jr. says: "The earnings improvement in our ongoing operations reflects the sharp gains posted in the businesses outside the U.S. The European and Pacific regions benefited from higher sales volume, better currency relationships, and a lower tax rate. In the North American region, earnings were lower in the specialty chemical segments, with the exception of plastics."

Du Pont, the largest U.S. chemical producer, cited an 8% rise in overseas sales volume and 11% growth in domestic volume of chemicals and specialty products. Average selling prices, according to Du Pont, increased 4% over the same period last year.

In addition to benefiting the companies primarily involved in chemical production, chemical operations came to the aid of oil companies, which found themselves suffering in the second quarter because of low margins in their product operations. At seven of the oil firms surveyed that also report net income from chemical operations, lower raw material prices and higher demand for petrochemicals pushed up earnings in the second quarter. The seven firms—Amoco, Atlantic Richfield, Chevron, Exxon, Mobil, Shell, and Texaco—registered a combined earnings increase of 71% for the second quarter compared with the same quarter last year to $659 million.

Mobil registered the largest increase among the seven; its net income from chemical operations soared 134% to $75 million. Earnings from chemicals also more than doubled at Chevron, whose net income rose 110% to $65 million. The smallest increase was a still healthy jump of 33% at Shell, whose chemical earnings totaled $101 million. The other increases were Exxon 83%, Atlantic Richfield 71%, Texaco 58%, and Amoco 49%. □